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ABSTRACT

The Department of Communication at the University of Oklahoma has developed a test of communication competencies to be administered to potential undergraduate business majors. In developing their list of competencies, department members were aided by previous work by the Speech Communication Association in identifying five broad categories of communication competence and 22 minimal communication competencies that children should have. Before determining their own list of competencies, department members identified topics covered in basic college communication courses, as determined by national surveys. They then examined and rejected two methods for assessing communication competencies (behavioral assessment and psychometric devices), deciding instead to use indirect measurement through written testing. The development of the written test was divided into four phases. In the first phase, department members identified six communication categories to be tested: formal speaking skills, development of arguments, analysis of messages, spontaneous communication skills, management of communication, and communication apprehension. The second phase focused on development of test items, the first pretest, and analysis of items. The third phase involved the revision of the test, the second pretest, and analysis of items. In the fourth phase, department members planned for further test revisions. (GT)

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THE DEVELOPMENT OF A COMMUNICATION COMPETENCY TEST AT THE UNIVERSITY OF OKLAHOMA

By

Marla Scafe and Ina C. Siler

Paper Presented at the
Annual Convention of the
Central States Speech Association
St. Louis, Missouri
April 7, 1979

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THE DEVELOPMENT OF A COMMUNICATION COMPETENCY TEST AT THE UNIVERSITY OF OKLAHOMA

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During recent years, educational institutions have come under harsh attack because of the increasing numbers of students graduating with deficiencies in basic communication and mathematical skills. Through the development of minimal competencies, the "back to basics" movement and educational innovations, teachers try to eliminate weaknesses. Speech communication educators particularly are concerned about developing oral communication competencies. Previous attempts have been made to develop measures that would assess various communication skills; however, most of these measures have been attitude-type scales.[1] Of the measures described by Larson, et al.,[2] none were objective tests that easily could be administered in the classroom. The absence of objective tests for measuring communication competencies was a concern of the Department of Communication at the University of Oklahoma. In the fall of 1977, the Department of Communication received a request from the College of Business to identify ways to assess the communication competencies of undergraduate business majors. The College of Business was concerned that their students did not have the oral communication skills necessary for success in the business

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community. Therefore, our department undertook the task of developing an appropriate communication competency test. While the test was designed for students at Oklahoma, we hoped this test might be appropriate for undergraduates at other colleges and universities. This paper will describe the task of developing a communication competency test. Specifically, the paper will 1) summarize previous attempts to identify and assess communication competencies and 2) describe the different phases in the development of this test.

Probably the most significant investigation undertaken by our discipline was the SCA National Project on speech communication competencies.[3] The initial work on this project began in the fall of 1973. Initially, the group conducted an extensive review of literature on cognitive, social and communication development of children, examined children's behaviors and attitudes in different communication settings and examined the attitudes of instructors and communication scholars on the goals of communication instruction in the schools. The committee sent questionnaires to elementary and middle school grade teachers and observed children in natural settings. As a result of their pilot studies, five broad categories of communication competence were identified:

> Controlling. These are acts in which the participants' dominant purpose is to control behavior. These acts include behaviors such as commanding, offering, suggesting, permitting, threatening, warning, prohibiting, contracting, refusing, bargaining, rejecting, acknowledging, justifying, persuading, and arguing.
>
> Feeling. These are acts in which the participants'dominant purpose is to express feelings and attitudes as an affective response. These acts tend to be spontaneous and are manifested because of the satisfactions they carry for the participants. Behaviors such as exclaiming, expressing a state or an attitude, taunting, commiserating, tale-telling, and blaming are included here.

Informing. These are acts in which the participants' purpose is to offer or seek information. These acts include behaviors such as stating pieces of information, questioning, answering, justifying, naming, pointing out an object, demonstrating, explaining, and acknowledging.

Ritualizing. These are acts that serve primarily to maintain social relationships and to facilitate social interaction. Such acts include greeting, taking leave, participating in verbal games (pat-a-cake), reciting, taking turns in conversations, participating in culturally appropriate speech modes (e.g. shucking, jiving, playing the dozens), and demonstrating culturally appropriate amenities.

Imagining. These are acts that cast the participants in imaginary situations. These acts include creative behaviors such as role-playing, fantasizing, speculating, dramatizing, theorizing, and storytelling.[4]

In addition to the SCA National Project, the Task Force on Competencies at the 1977 SCA meeting identified 22 minimal competencies that children should have. They also developed criteria by which to judge the practicality of the competencies:

1. Competencies should be functional;
2. Competencies could be developed through instruction; and
3. Competencies had to be general enough whereby institutions everywhere could use them as guidelines.

The 22 competencies identified were:

1. listen effectively
2. decode nonverbal accurately
3. appropriate words and pronunciation and grammar
4. use nonverbal effectively
5. use voice effectively
6. identify main ideas of a message
7. identify facts and opinions
8. identify informative and persuasive messages
9. identify biases in messages
10. recognize others not understanding
11. express ideas clearly
12. use evidence
13. organize messages
14. ask questions that help
15. answer questions effectively
16. give concise directions
17. summarize messages

18. listen courteously
19. describe another's view point
20. discuss differences of opinion
21. express feelings appropriately
22. perform social rituals

At first glance, it appears that these competencies represent reasonable expectations of students. However, they fail to meet the criteria developed by the Task Force. For example "listen effectively" might be a teachable behavior, but a teacher would have difficulty accurately measuring competence in this area. Larson, et al., discuss the problems encountered when trying to measure functional communication competencies. They indicate that determining what is inside the heads of the communicator is difficult. Generally, competence is determined by the individual's behavior. For example, a student might give a speech that is considered very persuasive by the listeners, yet not know why the speech was persuasive. Moreover, the observer of behavior must take into consideration the appropriateness of the behavior for the context.

The communication competencies presented above were helpful as we attempted to develop our own list of competencies. We, too, were concerned about developing reasonable communication competencies that were teachable and testable. Before determining an appropriate method of assessment, we examined 1) the content of the basic communication at the University of Oklahoma as a basis for determining our list of competencies, and 2) we identified previous methods for assessing competencies.

Course Content

In national surveys conducted by Barrymore and Weaver[5] and Lehman and Churchill[6] the content in the basic course at major universities across the country was identified. Eleven topics were included in all courses.

Several topics were included in only 1 or 2 courses. The topics included:

1. language behavior
2. reasoning and organization
3. audience analysis
4. feedback
5. nonverbal communication
6. self concept
7. listening
8. interviewing
9. perception
10. informative & persuasive speaking
11. communication contexts

In addition to topic concerns, Lehman and Churchill found that: 50% of the responding departments indicated that theory and skill building were emphasized equally in their course; 35% indicated that the course was mostly skill with some theory; and 15% indicated that the course was mostly theory with some skill. Regardless of the content, the majority of introductory level courses provide some opportunity for skill development. We found that the content of our basic course was the same as the content identified in the national surveys. We concluded that our introductory course was not very unique, and that students taking this course at the University of Oklahoma would get information and experience similar to that acquired by students at other colleges and universities. Since, we were developing a test that possibly could be used at other colleges and universities, we decided that the competencies developed for the test at Oklahoma probably would be testable at other institutions.

Assessment Techniques

After examining course content, we had to determine whether to measure communication competencies behaviorally or cognitively. The same issue was faced by researchers who developed measures for communication apprehension.[7] Researchers have used both behavioral techniques and cognitive techniques for assessing communication apprehension. Ideally, behavioral assessment would be the best way to determine communication competence, however these

methods often suffer from the problem of low reliability. For example, a panel of judges might be responsible for listening to speeches and determining competence in public speaking using rating scales. Becker[8] and Clevenger[9] noted low inter-judge reliability as a problem with this assessment technique.

We also were concerned with whether the use of rating scales would provide a valid measure of communication performance. Again, the research findings cast doubt on the validity and reliability of this method.[10] Apparently measures such as public speaking scales do not measure what they purport to measure. Through factor analytic techniques, DiSalvo and Bochner[11] found that people usually rate speeches along one or two dimensions--analysis and delivery, while ignoring other dimensions. Generally, speech teachers assume that a student should know several public speaking principles, and they teach those particular principles. Unfortunately, the scales a teacher might use only focus on analysis and/or delivery.

Last, we realize that behavioral assessment could be costly and time consuming. The Department of Communication was faced with this problem when the College of Business asked us to test 800 business majors in public speaking only. If a panel of expert judges i.e. professors of communication, would listen to one speaker every ten minutes, it would take approximately 8,000 minutes or 134 hours. If three judges would devote two hours a day, it would take at least 68 days to accomplish the task of listening to and evaluating 800 speakers. To purchase one quarter of a professor's time for a semester is costly. Three professors at a total of $12,000 to $16,000 was too much for the College of Business to pay. Anyone who decides to assess competencies behaviorally probably will encounter this dilemma. Added to the frustration of time and cost, is the problem associated with determining reliability and validity of the assessment method. Moreover,

assessing public speaking is only one communication skill. Suppose teachers wanted to assess competencies in group decision making, interpersonal skills and apprehension! Behavioral assessment of communication skills would be ideal, however not practical. Accurate assessment of a student's communication behavior should be made in the actual setting. Unfortunately, the task of behavioral assessment presents obstacles that even the well-meaning educator might have difficulty overcoming.

Two options for assessing communication competencies remain: psychometric devices and indirect measures. Psychometric devices, which measure psychological factors are designed to measure responses to psychological and physical stimuli with mechanical equipment. For example, galvanic skin responses are measured by machines that register the amount of perspiration produced by a stimulus such as anxiety.[12] Psychometric devices for indexing physiological attributes were eliminated for several reasons. First, the costs for equipment are high. Besides, the devices can not accurately measure physiological aspects of internal behavior such as withdrawal, communication apprehension, or empathy. Furthermore, it would be difficult to measure any of the competencies identified by the National Project or the Task Force using psychometric devices.

The alternative for measuring communication competence is indirect measurement. Indirect measures refer to assessing behavior through written tests. This method can be inexpensive, time efficient, and easily adapted to different needs and situations. If tests are developed correctly, they can be valid and reliable. They are among the best procedures for assessing knowledge about behavior. The competence-performance controversy has existed in communication and linguistics for years. Evaluators can not know whether

a person knows why he acts a certain way. Neither can we say that knowledge of appropriate behaviors means the person will behave appropriately in a particular situation. Through indirect measures we can at least assume that a person will behave appropriately. The National Assessment of Educational Progress (NAEP), which administers tests to students from all parts of the country, favors indirect measurement strategies. NAEP and SCA's Feasibility Project both explored behavioral and indirect measures of assessment. As a result of their efforts, indirect measures of speaking skills were developed because they were most efficient and practical.[13]

The Development of the Test

In keeping with the NAEP and SCA's Feasibility Project, the Department of Communication made its first attempt in the spring of 1977 to develop a communication competency test. As stated earlier, the test will be administered to potential undergraduate majors in the College of Business. All potential business majors will be required to take the introductory communication course. Students who receive a grade of B or better in the course are then qualified for admission into the College of Business. Students receiving a grade of C or lower will be required to take the competency test. If the student passes the test, he then will be eligible for admission to the College of Business. If the student fails the test, he or she will be directed to take a course that parallels the deficiencies diagnosed by the test. If the student passes the second course with a grade of B or better, he or she is then qualified for adminission to the College of Business. If the student receives a grade of C or lower, he or she will be required to take a competency test only in the area that was diagnosed as deficient by the first test.

The development of the test was divided into four phases. The first

phase dealt with identification of communication competencies the business student should have. The second phase focused on development of test items, the first pre-test, and analysis of items. The third phase involved the revision of the test, the second pre-test, and analysis of items. In the fourth phase, we planned for further test revisions.

Phase I. In the first phase, we identified the desired communication competencies appropriate for the business major. The College of Business specified various communication skills they felt were important for their students to acquire. They selected: planning, logic, perception; communicating without fear or anxiety; listening, orally communicating with individuals, small groups, and before audiences; conference leadership; and nonverbal awareness. Our final list of competencies was not as easily created, because our objective was to include a broad range of communication skills rather than curriculum divisions. The difficulties we encountered were similar to the ones encountered by the NAEP and SCA Feasibility Project. There seems to be a lack of specification of communication competencies because of the inconsistencies that exist in speech curricula across the country. To handle this dilemma, we consulted previous efforts of Allen and Brown[14] and Wood[15]. Based on information compiled from these sources, we developed the communication competencies we wanted to test. We created the following grid:

Figure 1

ELEMENTS OF COMMUNICATION	PUBLIC SPEAKING	INTERPERSONAL COMMUNICATION (informal)	INTERVIEWING	SMALL GROUP AND CONFERENCE LEADERSHIP
Formal Speaking Skills delivery audience analysis nonverbal				
Developing Arguments reasoning evidence logic				
Analyzing Messages planning organizing language				
Spontaneous Communication Skills perception listening nonverbal				
Managing Communication negotiation interaction analysis				
Communication Apprehension				

It is apparent that the categories are not mutually exclusive. The categories represent different communication contexts where both verbal and nonverbal communication are emphasized. The competencies we have identified are similar to SCA's five functions. Our competencies include aspects of controlling and being controlled. We are also concerned with overt behaviors as well as the knowledge underlying these behaviors. For example, analyzing messages is just as important as the overt act of delivering a speech.

Phase II. In this phase of the project, the test items were developed. Graduate students enrolled in a Measurement in Communication Education Seminar at the University of Oklahoma were responsible for writing test items.[16] The first test consisted of 50 multiple choice items with five alternatives. The test was given to students in 30 sections of the basic communication course (N=357). The data were analyzed for item difficulty and item discrimination. (See Appendix A for results.) The mean score was 27.89, with a standard error of 2.973. Reliability, which was determined by Kuder Richardson 20 was .78. The Educational Testing Service determined that item difficulty score for a test item should be between the .20 and .80 range. Item difficulty results showed eight items to be over the .80 limit. These items were considered too easy because 80% or more of the students answered the questions correctly. These same eight questions also do not discriminate well between high achieving and low achieving students. Items 33, 43, 44, and 48 fell below the .20 level of item difficulty. Even the students who performed well on the test as a whole were not able to answer these questions correctly. Only items 23, 26, and 50 had alternatives which were not taken.

Phase III. In this phase, we made the first revision. Based on results

obtained from the first test analysis, items with item difficulty scores ranging from .20 to .80, and items having at least some of the test population choosing all alternatives were used on the second test. Additional test items were written so that the second test had 80 items with 4 alternatives. The second test was given to samples representing populations of a large, predominantely Black urban university; a small, religious college; a small, urban community college; and a large Southwestern University (N=94). The data gathered from the second test were analyzed for item difficulty and item discrimnation. Kuder Richardson 20 reliability statistic also was computed. (See Appendix B for results.)

The mean score was 34.884 with a standard error of 3.972. The Kuder-Richardson 20 reliability coefficient was .75. Item difficulty results showed two items to be over the .80 limit and three items with item difficulty scores of .79. Fourteen items fell below the .20 level of item difficulty. Eighteen percent of the test items were difficult. Item 3 was the only item where one alternative answer was not selected. Items 21, 40, and 57 negatively correlated with the test. A negative correlation between a test item and the test indicates that people who scored well on the test answered the item incorrectly. A positive correlation between the test item and the test indicates that people who did not score well on the test missed the item. Items that correlate negatively or near zero with the total test score are not desirable items to have on a test. Miller[17] states in his paper on assessing interpersonal communication competence by objective examination, "When individual test items are problematic, it is justifiable to drop them. The net result is a better, i.e. purer, test." Cronbach[18] further states that content validity is not lost as long as the

test retains its representativeness over the content areas.

Phase IV. Presently we are making the second revision of the test. Inspection of test items revealed information that will be helpful as we continue to revise the test. First, there were low correlations between the majority of the test items and the whole test. These low correlations may have been the result of fatigue. With an 80 item test, a student is likely to randomly respond to a question regardless of the question content. Random responses reduce reliability coefficients. There are three options for future test administration. The test can remain an 80 item test. The number of test items can be reduced to 50 or 60 items. If the 80 item test format is used again, the test can be given on two consecutive days. If one of the last two options is selected, the fatigue factor might be minimized.

Second, the items that were below or above the ETS item difficulty range will be eliminated from the next revision. At least one more revision is necessary before the test is given to potential business majors.

Conclusion

This paper was designed to describe the attempts by the Department of Communication at the University of Oklahoma to develop a communication competency test. After reviewing previous research efforts in this area, we decided the indirect method of assessing communication behavior would be appropriate. We identified the communication competencies we wanted to test, wrote the test items, and pre-tested the test twice. We are now making the second revision of the test, which will be given again this summer. Hopefully, this will be the last revision so that we can begin administering the test to the College of Business majors.

ENDNOTES

[1]Carl Larson, Phil Backlund, Mark Redmond, and Alton Barbour, Assessing Functional Communication. (Washington, D. C.: SCA Publication Board, 1978).

[2]Larson, et al., 1978.

[3]R. R. Allen and Kenneth L. Brown, eds., Developing Communication Competence in Children (Skokie, Illinoise: National Textbook Company, 1976).

[4]Allen and Brown, 1976, pp. 202-3.

[5]Cynthia Barrymore and Richard Weaver II, "Survey of the Interpersonal Course at U. S. Colleges and Universities," A paper presented at the Midwest Basic Course Directors Conference, Lawrence, Kansas, February 10, 1978.

[6]Robert Lehman and Gilbert A. Churchill, Jr., Unpublished Marketing Survey and Analysis of the Basic Course, William C. Brown, Publishing Company, 1977.

[7]See for example, T. Clevenger, Jr., "A Synthesis of Experimental Research in Stage Fright," Quarterly Journal of Speech, 45 (1959), 134-145.

[8]Samuel Becker, "The Rating of Speeches: Scale Independence," Speech Monographs, 29 (1962), 38-44.

[9]Theodore Clevenger, Jr., "Influence of Scale Complexity on the Reliability of Ratings of General Effectiveness on Public Speaking," Speech Monographs, 31 (1964), 153-156.

[10]See for example Keith Brooks, "Some Basic Considerations in Rating Scale Development: A Descriptive Bibliography," Central States Speech Journal, 9 (1957),27-31.

[11]Vincent DiSalvo and Arthur Bochner, "The Use of Simulated Speech Profiles and the PROF Technique in Capturing the Policies of Speech Raters," Speech Teacher, 21 (1972), 272-280.

[12]J. P. Guilford, Psychometric Methods (New York: McGraw-Hill, 1954).

[13]Nacy Mead, "Issues Related to a National Assessment of Speech and Listening Skills," A paper presented at the Speech Communication Association Convention, Washington, D. C., December 1977.

[14]Allen and Brown, 1976.

[15]See Barbara S. Wood, Developing Communication Competencies in Children: Pre-K through Grade Six (Urbana, Illinois: ERIC Clearinghouse on Reading and Communication Skills, 1976); and Barbara S. Wood, Developing Communication Competencies in Children: Grades 7-12 (Urbana, Illinoise: ERIC Clearinghouse on Reading and Communication Skills, 1977).

[16]This seminar which was conducted by William D. Brooks consisted of the following students: Warren Watson, Faron Hurst, Ina Siler, Michael Lewis, Hugh Gray, Marla Scafe, Raymond Rogers, and Jim Tobergte.

[17]Larry D. Miller, "Assessing Student Competence in Interpersonal Communication by Objective Examination: Rationale, Application and Data." Unpublished manuscript at Indiana University, 1977.

[18]L. Cronbach, Essentials of Psychological Testing (New York: Harper and Row, 1970).

APPENDIX A

ITEM ANALYSIS FOR THE FIRST PRETEST

Item	1	2	3	4	5	Item Difficulty
1	0.11	0.10	0.10	0.04	0.64	0.64
2	0.63	0.21	0.05	0.03	0.08	0.63
3	0.04	0.03	0.58	0.07	0.28	0.58
4	0.31	0.36	0.16	0.05	0.11	0.36
5	0.06	0.06	0.80	0.06	0.02	0.80
6	0.39	0.15	0.04	0.33	0.08	0.39
7	0.50	0.24	0.03	0.06	0.18	0.24
8	0.06	0.03	0.06	0.04	0.80	0.80
9	0.14	0.06	0.04	0.26	0.50	0.26
10	0.11	0.27	0.06	0.42	0.13	0.27
11	0.71	0.04	0.20	0.03	0.02	0.71
12	0.05	0.79	0.02	0.05	0.09	0.79
13	0.03	0.01	0.02	0.43	0.51	0.43
14	0.02	0.01	0.06	0.14	0.77	0.77
15	0.11	0.06	0.54	0.06	0.22	0.54
16	0.02	0.01	0.01	0.39	0.56	0.56
17	0.10	0.61	0.22	0.07	0.01	0.61
18	0.80	0.11	0.04	0.03	0.02	0.80
19	0.02	0.03	0.76	0.07	0.11	0.76
20	0.06	0.11	0.06	0.61	0.15	0.61
21	0.02	0.77	0.11	0.01	0.08	0.77
22	0.76	0.01	0.04	0.09	0.10	0.76
23	0.77	0.02	0.00	0.02	0.18	0.77
24	0.10	0.01	0.06	0.77	0.06	0.77
25	0.13	0.10	0.09	0.09	0.58	0.58
26	0.00	0.00	0.01	0.95	0.03	0.95
27	0.91	0.01	0.02	0.02	0.04	0.91
28	0.04	0.04	0.87	0.01	0.04	0.87
29	0.15	0.06	0.06	0.68	0.04	0.68
30	0.04	0.20	0.52	0.13	0.10	0.52
31	0.04	0.04	0.22	0.06	0.64	0.64
32	0.15	0.24	0.31	0.28	0.02	0.31
33	0.40	0.18	0.03	0.25	0.14	0.18
34	0.01	0.04	0.04	0.20	0.70	0.70
35	0.01	0.81	0.03	0.03	0.12	0.81
36	0.03	0.03	0.03	0.88	0.03	0.88
37	0.01	0.03	0.02	0.63	0.30	0.63
38	0.02	0.11	0.01	0.43	0.42	0.43
39	0.06	0.10	0.08	0.52	0.22	0.52
40	0.14	0.05	0.10	0.67	0.03	0.67
41	0.04	0.03	0.37	0.19	0.35	0.37
42	0.15	0.04	0.06	0.04	0.69	0.69
43	0.14	0.10	0.42	0.12	0.20	0.14
44	0.01	0.04	0.02	0.78	0.15	0.15
45	omitted by computer					
46	0.34	0.20	0.35	0.01	0.10	0.34
47	0.04	0.07	0.10	0.16	0.62	0.62
48	0.50	0.03	0.06	0.31	0.10	0.06
49	0.15	0.46	0.04	0.02	0.32	0.32
50	0.01	0.00	0.02	0.29	0.67	0.29

APPENDIX B

ITEM ANALYSIS FOR THE SECOND PRETEST

Item	1	2	3	4	Item Difficulty	Item Correlation
1	*0.65	0.25	0.07	0.02	0.65	0.19
2	0.12	0.45	0.37	0.05	0.37	0.17
3	0.42	0.00	0.01	0.57	0.57	0.30
4	0.11	0.01	0.86	0.02	0.86	0.14
5	0.09	0.03	0.41	0.29	0.09	0.13
6	0.46	0.13	0.25	0.16	0.46	0.12
7	0.27	0.17	0.11	0.45	0.45	0.34
8	0.07	0.67	0.14	0.12	0.67	0.30
9	0.15	0.47	0.05	0.33	0.33	0.39
10	0.47	0.11	0.08	0.34	0.34	0.24
11	0.24	0.27	0.14	0.35	0.35	0.30
12	0.14	0.06	0.53	0.27	0.53	0.28
13	0.11	0.28	0.12	0.48	0.28	0.13
14	0.23	0.48	0.21	0.07	0.48	0.01
15	0.20	0.14	0.36	0.31	0.36	0.26
16	0.03	0.45	0.03	0.33	0.45	0.19
17	0.34	0.15	0.28	0.23	0.34	0.29
18	0.31	0.22	0.42	0.04	0.31	0.22
19	0.29	0.52	0.11	0.08	0.52	0.19
20	0.06	0.58	0.06	0.29	0.06	0.17
21	0.16	0.47	0.16	0.21	0.47	-0.07
22	0.65	0.14	0.17	0.04	0.65	0.29
23	0.44	0.09	0.05	0.41	0.44	0.04
24	0.07	0.11	0.06	0.76	0.76	0.44
25	0.18	0.08	0.32	0.42	0.18	0.25
26	0.59	0.05	0.02	0.34	0.59	0.14
27	0.66	0.13	0.08	0.13	0.66	0.38
28	0.06	0.43	0.07	0.43	0.43	0.27
29	0.18	0.18	0.46	0.17	0.46	0.25
30	0.03	0.06	0.07	0.83	0.83	0.35
31	0.12	0.61	0.23	0.04	0.61	0.10
32	0.63	0.16	0.09	0.12	0.63	0.36
33	0.05	0.23	0.26	0.45	0.45	0.24
34	0.15	0.54	0.20	0.12	0.54	0.37
35	0.41	0.49	0.05	0.04	0.49	0.01
36	0.05	0.31	0.03	0.61	0.61	0.32
37	0.07	0.55	0.34	0.04	0.55	0.25
38	0.17	0.13	0.54	0.17	0.17	0.20
39	0.19	0.07	0.04	0.69	0.07	0.08
40	0.28	0.18	0.15	0.39	0.15	-0.02
41	0.35	0.21	0.05	0.39	0.35	0.15
42	0.41	0.26	0.17	0.16	0.41	0.16
43	0.35	0.26	0.33	0.06	0.26	0.25
44	0.42	0.06	0.05	0.45	0.42	0.10
45	0.35	0.15	0.17	0.32	0.32	0.20

*These figures are item discriminations.

APPENDIX B (Cont.)

Item	1	2	3	4	Item Difficulty	Item Correlation
46	0.33	0.31	0.16	0.21	0.31	0.23
47	0.16	0.54	0.06	0.24	0.16	0.1
48	0.27	0.15	0.18	0.40	0.27	0.32
49	0.37	0.11	0.25	0.27	0.25	0.20
50	0.09	0.08	0.03	0.79	0.79	0.40
51	0.03	0.25	0.40	0.31	0.31	0.19
52	0.43	0.37	0.08	0.12	0.43	0.13
53	0.60	0.07	0.01	0.32	0.60	0.16
54	0.07	0.11	0.06	0.76	0.76	0.32
55	0.39	0.12	0.42	0.07	0.42	0.21
56	0.14	0.06	0.22	0.57	0.06	0.11
57	0.16	0.14	0.23	0.47	0.14	-0.03
58	0.11	0.12	0.75	0.03	0.75	0.34
59	0.16	0.05	0.14	0.65	0.65	0.36
60	0.13	0.20	0.15	0.53	0.13	0.06
61	0.11	0.18	0.60	0.12	0.60	0.06
62	0.23	0.12	0.29	0.36	0.29	0.16
63	0.14	0.25	0.08	0.53	0.53	0.25
64	0.06	0.54	0.20	0.19	0.54	0.36
65	0.34	0.25	0.16	0.24	0.34	0.28
66	0.16	0.27	0.15	0.42	0.16	0.14
67	0.08	0.06	0.06	0.79	0.79	0.35
68	0.03	0.36	0.07	0.51	0.51	0.41
69	0.15	0.22	0.43	0.20	0.43	0.23
70	0.05	0.66	0.14	0.15	0.66	0.40
71	0.01	0.07	0.13	0.79	0.79	0.28
72	0.15	0.18	0.01	0.66	0.66	0.23
73	0.18	0.08	0.15	0.59	0.15	0.23
74	0.19	0.13	0.35	0.34	0.34	0.24
75	0.11	0.06	0.32	0.52	0.52	0.33
76	0.43	0.13	0.12	0.33	0.13	0.26
77	0.42	0.14	0.36	0.08	0.08	0.11
78	0.24	0.18	0.46	0.12	0.46	0.25
79	0.05	0.05	0.45	0.43	0.45	0.13
80	0.15	0.14	0.26	0.45	0.45	0.10